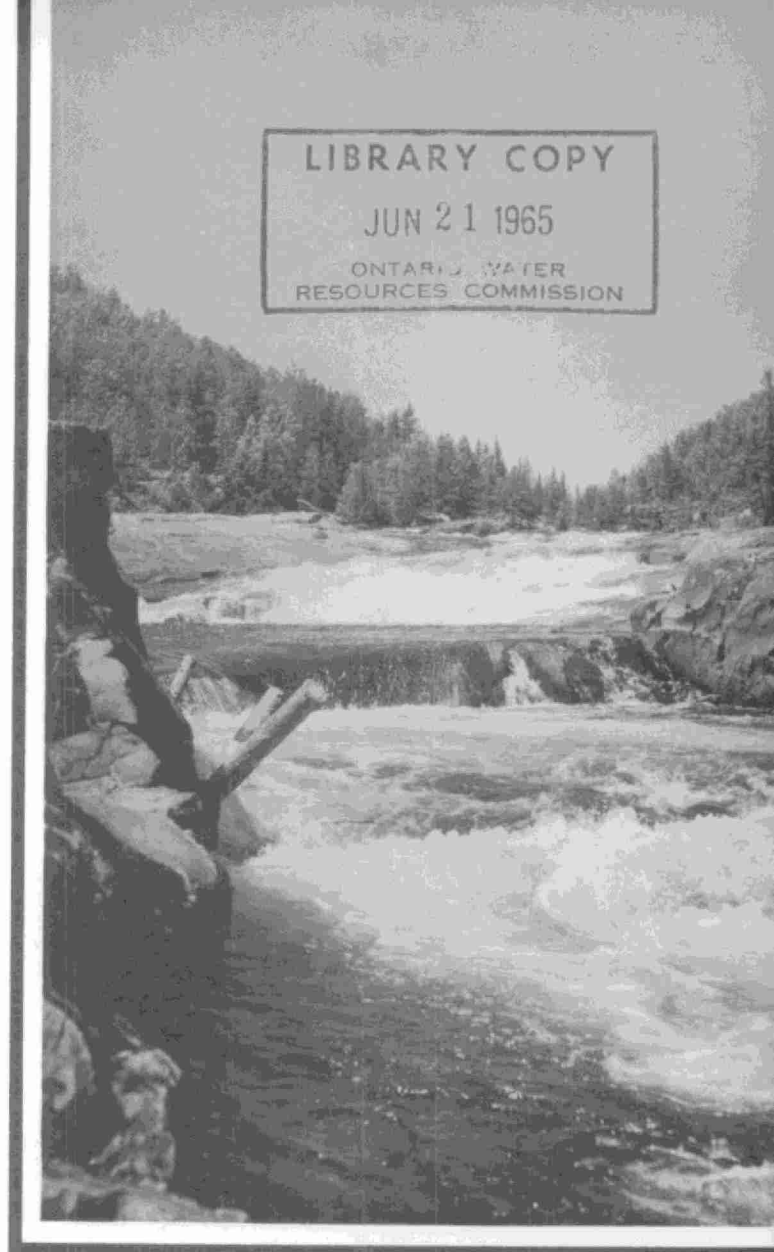


*Tillsonburg
Sewage
Treatment
Plant*



1963 Annual Report

Ontario Water Resources Commission

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ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

Mayor and Members of Council,
Town of Tillsonburg.

Gentlemen:

I am pleased to submit, for your information, the 1963 Annual Operating Report of the Tillsonburg Sewage Treatment Plant, OWRC Project No. 58-S-12, which has been prepared by our Division of Plant Operations.

We are grateful for the kind cooperation which you and your staff have extended to our Operations staff throughout the year. We look forward to a continuing close association with you in our mutual endeavour to control pollution.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly", is written over the typed name.

D. S. Caverly,
General Manager



General Manager,
Ontario Water Resources Commission.

Dear Sir:

It is with pleasure that I present to you the Annual Report of the operation of the Tillsonburg Sewage Treatment Plant, OWRC Project No. 58-S-12 for 1963.

This report presents design data, outlines operating problems encountered and summarizes in tables, charts and graphs all significant flow and cost data.

Yours very truly,

B. C. Palmer,
Director,
Division of Plant Operations.

foreword



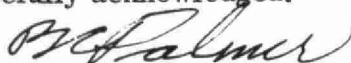
This report is designed to present the highlights of the operation of these works during 1963. Trends in flows and other operating data can be extremely

useful in the development of necessary long range enlargement and improvement programs.

In addition to the activities reported herein, much unrecorded effort has contributed to the success of this operation. The municipality, through representatives on the Local Advisory Committee, has given valuable assistance in reviewing salary schedules, detailed operating budgets, personnel problems, flow patterns, and major maintenance problems.

The Division of Plant Operations has provided direction to the field staff in administrative procedures, quality control, maintenance schedules, equipment inspection and purchase supervision. A number of other Divisions of the Commission have been of service. The Division of Construction has offered helpful advice on equipment selection and renovation problems. The Division of Sanitary Engineering has maintained, through its District Engineering staff, a keen interest in the operation and has made a number of constructive recommendations. Its operator training courses have been very helpful. The Division of Finance has processed many payrolls, purchase orders and invoices dealing directly with this project. The Commission Personnel Director has been most helpful in the selection of new staff.

The excellent cooperation of all of these groups is gratefully acknowledged.



B. C. Palmer,
Director,
Division of Plant Operations



DIVISION OF PLANT OPERATIONS

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C. W. Perry
Assistant Director
A. C. Beattie
Regional Supervisor
P. J. Osmond
Operations Engineer

TILLSONBURG SEWAGE TREATMENT PLANT

OPERATED FOR

THE TOWN OF TILLSONBURG

BY

THE ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN

A. M. Snider

COMMISSIONERS

W. D. Conklin, Q. C.

J. H. H. Root, M. P. P.

J. A. Vance, LL. D.

A. A. Wishart, Q. C., M. P. P.

GENERAL MANAGER

D. S. Caverly

ASSISTANT GENERAL MANAGERS

G. M. Galimbert
L. E. Owers

COMMISSION SECRETARY

W. S. MacDonnell

1958^{to} 1963 History

INCEPTION

The Town approached the Ontario Water Resources Commission to undertake the financing, construction and operation of a new sewage treatment plant.

The firm of R. V. Anderson and Associates, Toronto Ontario, Consulting Engineers, was engaged to prepare plans and specifications for the project.

CONSTRUCTION

In December 1958 construction began. Schwenger Construction Company Limited, Burlington, constructed the plant and pumping station with associated equipment and appurtenances. W. A. Haggerty Construction Limited constructed the force main and sanitary sewers. In February 1961 the Division of Plant Operations of the Commission began the operation of this new project.

TOTAL COST

The total cost of the project was \$606,243.43.

Project Staff

J. H. Allin
Chief Operator

W. D. Ronson
Operator

COMMENTS

There are two members on the plant staff. They provide an 8 hour supervision of the plant during the week days and a partial coverage on Saturday and Sunday.

During 1963 both members of the staff successfully completed the final course of a series of three courses sponsored by the Ontario Water Resources Commission for sewage plant operators. On the completion of the course they received their Certificate of Qualification as Sewage Works Operators.

Mr. Allin also attended an Ontario Water Resources Commission Chief Operators Conference in Toronto during the fall of 1963.

Description of Project

INFLUENT WORKS

The plant flow enters an influent chamber from a 12 inch diameter forcemain from the John Pound Street Pumping Station and a 15 inch diameter gravity sewer. The influent chamber is equipped with an adjustable bypass weir.

From the influent chamber the flow passes through a barminutor which continuously screens and cuts the coarse material in the sewage without removing it from the flow. A bypass screen is also provided in case the barminutor breaks down.

The flow then passes through an Aer-degritter which removes the sand and grit and allows the organics to remain in suspension.

PRIMARY CLARIFIERS

Two rectangular settling tanks receive the sewage from the grit removal unit. Approximately 50% of the suspended solids in the incoming sewage settles to the bottom of the tanks.

A set of flight collectors moves the sludge on the bottom to one end of the tank from where it is drawn off into a hopper. The flights also skim the surface and remove floating material which is also put into the hopper. The contents of the hopper are then pumped into the digester. The settled sewage then flows over the weirs to the aeration tanks.

AERATION SECTION

The effluent from the primary tanks flows into two single pass aeration tanks where it is mixed with the activated sludge returned from the final settling tanks. The mixture is aerated for a period of 10.1 hours at design flow. The two tanks allow for some flexibility in the method of their operation. The air is supplied by two blowers located in the control building to the headers located at the bottom of the tank. The headers are equipped with Sparjer air diffusers.

FINAL CLARIFIERS

The aerated mixed liquor from the aeration tanks is retained in two rectangular tanks for a period of 2.77 hours at design flow. This allows the activated sludge to settle and it is collected and returned to the aeration section or wasted. (Excess activated sludge is returned or "wasted" to the primary clarifiers where it settles and is pumped to the digester). The remaining liquid flows over the weirs of the final clarifiers, and is chlorinated in the chlorine contact chamber and then flows to the creek.

SLUDGE DIGESTION TANK

The Tillsonburg plant utilizes a single stage digestion. The single tank is 45 feet in diameter and has a floating cover. The sludge from the digester is pumped through a heat exchanger and recirculated back to the digester in order to maintain a temperature of approximately 95° F. Digested sludge is hauled away from the digester by tank truck.

Design—Data

JOHN POUND STREET PUMPING STATION

RAW SEWAGE PUMPS

- No. 1 - Chicago Pump Company - capacity 458 gpm @ 26.5 TDH
7 1/2 HP motor.
- No. 2 - Chicago Pump Company - capacity 687 gpm @ 29.5 TDH
10 HP motor.
- No. 3 - Chicago Pump Company - capacity 917 gpm @ 33.5 TDH
15 HP motor.

COMMINUTION

One 18" Chicago Pump Barminutor Type "B". Also a bypass channel with bar screen.

TREATMENT PLANT

Type of Plant - activated sludge.

Design Population - 7,000 persons.

Design Plant Flow - 665,000 gallons/day.

Per Capita Flow - 95 gallons

Five Day BOD -

Raw Sewage - 235 ppm

Removal - 95%

Suspended Solids -

Raw Sewage - 250 ppm

Removal - 95%

PRIMARY TREATMENT

Influent Sewer

12" forcemain from John Pound Street Pumping Station
15" gravity sewer from the east side of town.

Comminution

One 18" Chicago Pump Barminutor - Type "C".
Also a bypass channel with bar screen.

Grit Removal

Chicago Pump Aer-degritter with dimensions of 13'x6'x8'.
The volume is 3,900 gallons and at design flow has a
detention period of 8.4 minutes.
The unit has a maximum capacity of 4.0 MGD.
The cross velocities at the bottom of the tank are approximately
2.0 feet per second.

Primary Settling Tank

Two rectangular primary clarifiers.
Each tank is 50' - 4" x 10' - 0" x 8' - 0" for a combined volume
of 50,300 gallons giving at detention time of 1.82 hours at design
flow. The sludge is collected by Jeffrey flight collectors.

Raw Sludge Pumps

One Chicago Pump, Scru-Flow pump with a capacity of 125 gpm @ 90' TDH
with a 7 1/2 HP motor.
One standby sludge pump, Wemco, Torque-flow with a capacity of 125 gpm
@ 65' TDH with a 10 HP motor.

SECONDARY TREATMENT

Aeration Tanks

Two single pass rectangular aeration tanks each 50' x 30' x 13' for a
combined volume of 281,000 gallons. Detention time of 10.1 hours at
design flow.

Air Supply

Two 24' header in each tank. Fourteen Walker Process Diffuser Sparjers per header for a total of twenty-eight sparjers per tank. Two Roots - Connersville 816 Blowers, each having a capacity of 875 cfm @ 7.5 psig. Each blower is driven by a 40 HP motor.

Secondary Settling Tanks

Two rectangular units each 50' - 4" x 10' - 0" x 12' - 3" having a combined volume of 77,000 gallons giving a detention period of 2.77 hours at design flow. The sludge is collected by Jeffrey Flight collectors.

Return sludge Pumps

Two Smart-Turner centrifugal pumps, each having a capacity of 250 gpm @ 25 TDH. Each pump is driven by a 3 HP U.S. Vari-Drive motor.

DIGESTER

One circular tank 45' - 0" diameter x 22' - 4" SWD with a Chicago Pump Company Pontoon type floating cover. (Maximum liquid height 20' - 1" at side wall and 26' - 7" at centre). Volume of digester is 36,000 cu. ft.

Heat Exchanger

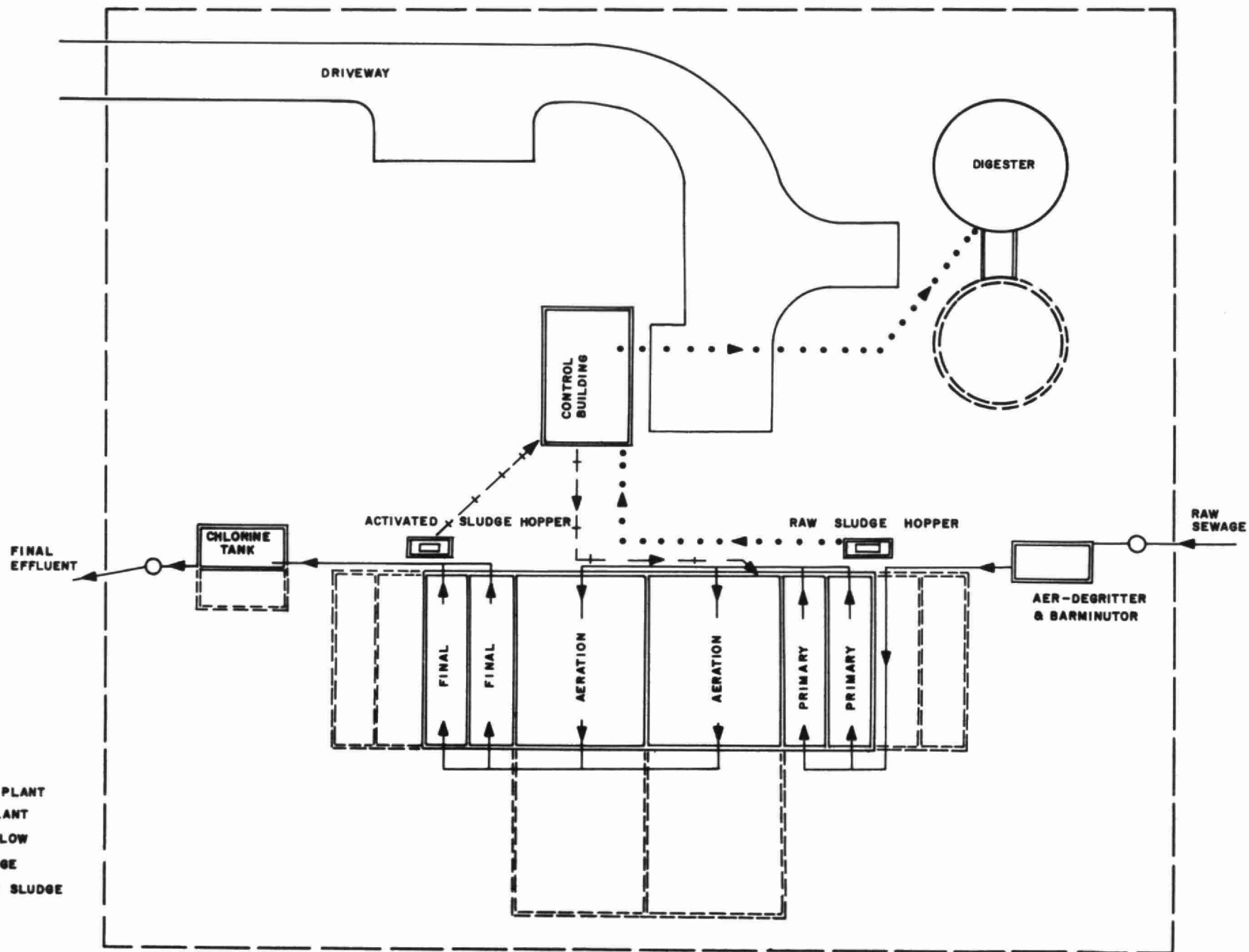
One Pacific Flush Tank Company heat exchanger operating on sewage gas or fuel oil to heat the sludge.
Rated capacity is 375,000 BTU/hour.

CHLORINATION

Chlorine contact chamber 20' - 0" x 11' - 3" x 9' - 9" having a volume of 13,950 gallons, giving a contact period of 30.2 minutes at design flow. One Wallace and Tiernan, Series A=731, V-Notch chlorinator with a capacity of 400 lbs/day.

Flow Measurement

The flow is measured by a Foxboro flow meter, which records, indicates and integrates the flow passing through a 9" Parshall flume. It also provides automatic control of the chlorinator.



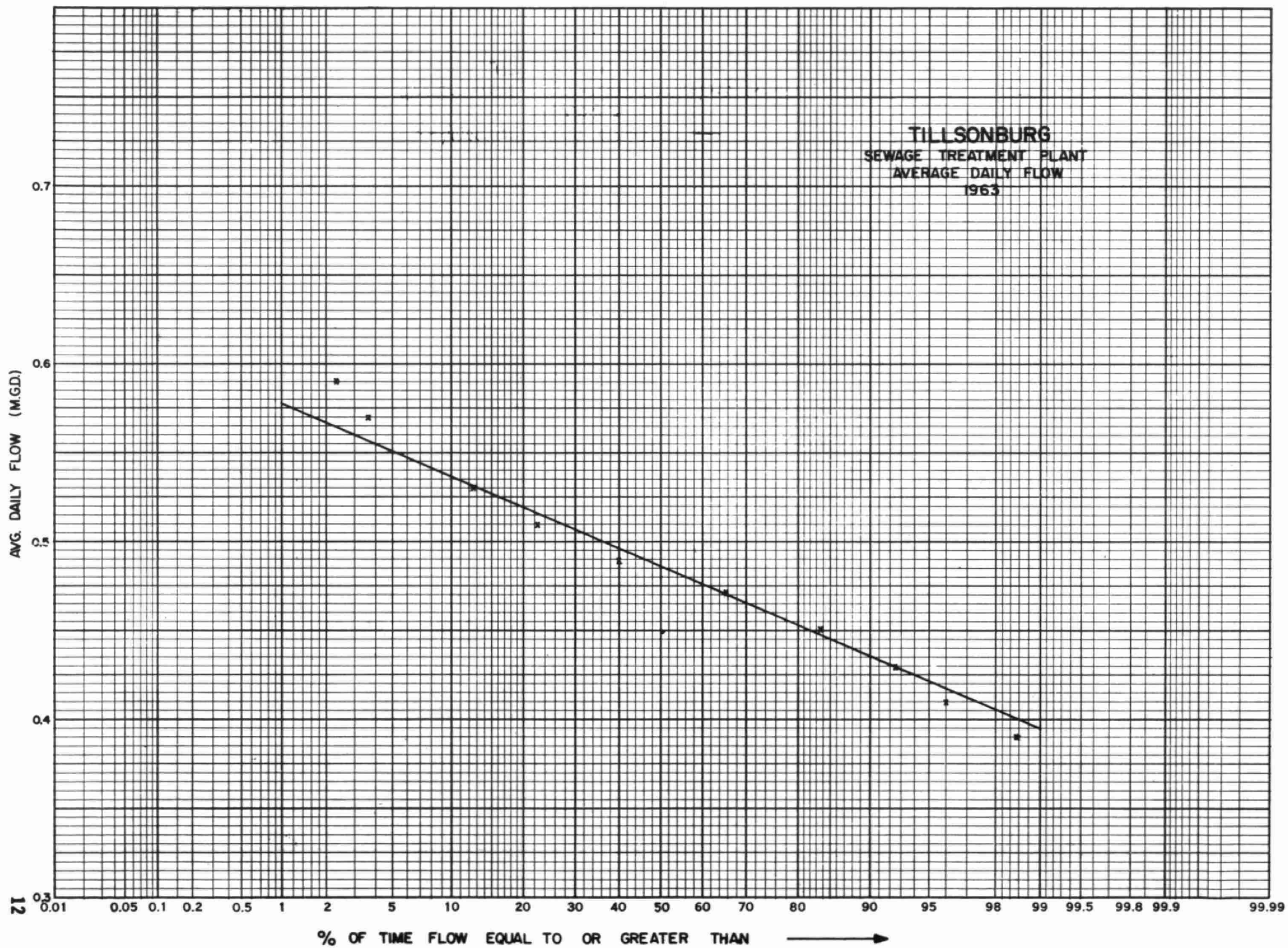
TILLSONBURG S.T.P.

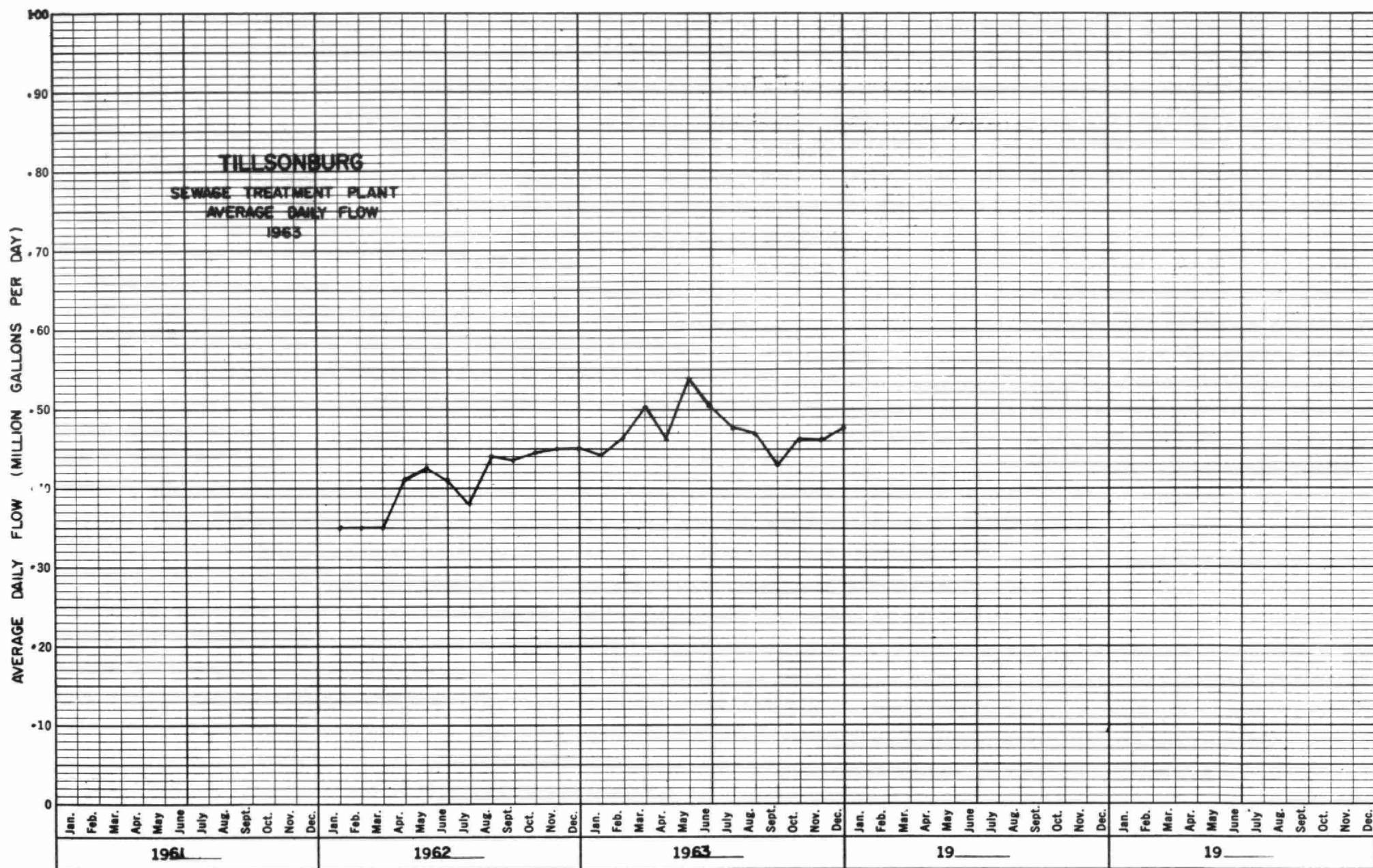
Process Data

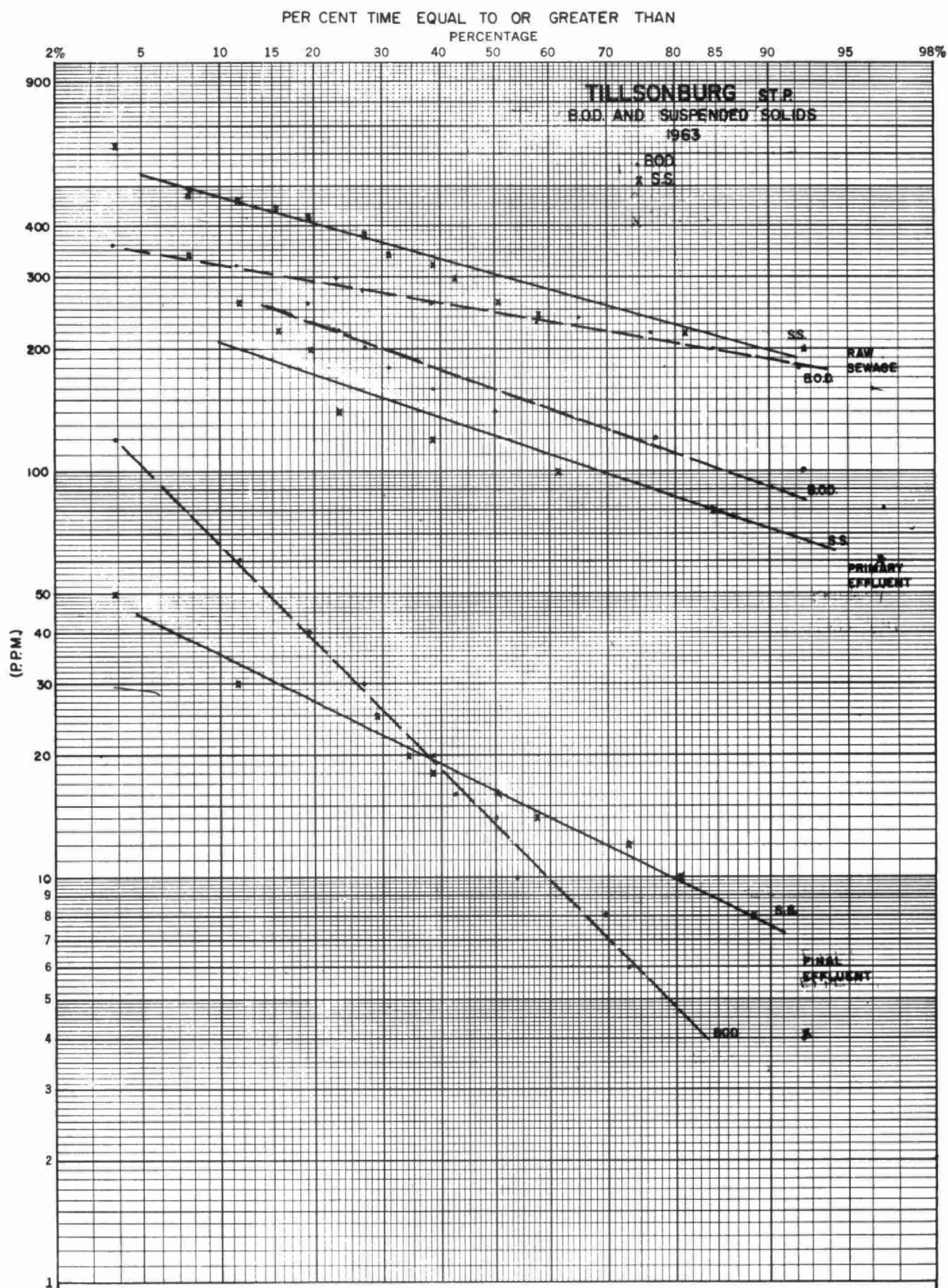
<u>MONTH</u>	<u>PLANT FLOW (MG)</u>	<u>AVG. DAILY FLOW MGD</u>	<u>MAX. DAILY FLOW MGD</u>
January	13.713	.442	.499
February	12.941	.462	.492
March	15.590	.503	.625
April	13.788	.460	.546
May	16.734	.540	.669
June	15.200	.507	.636
July	14.682	.474	.527
August	14.535	.469	.510
September	12.910	.430	.504
October	14.305	.461	.511
November	13.805	.460	.534
December	<u>14.818</u>	<u>.478</u>	<u>.516</u>
Total	173.024		
Average		.474	

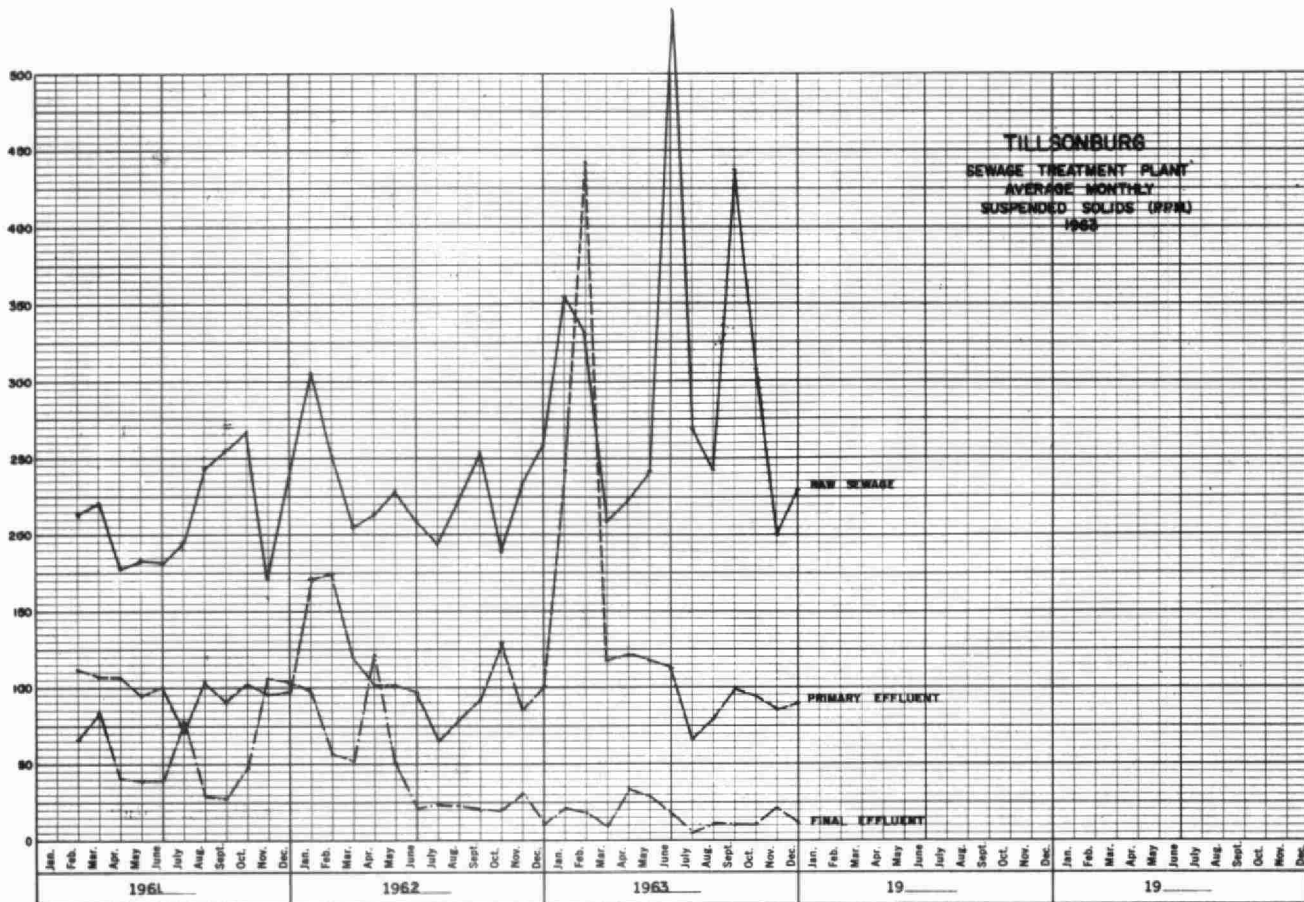
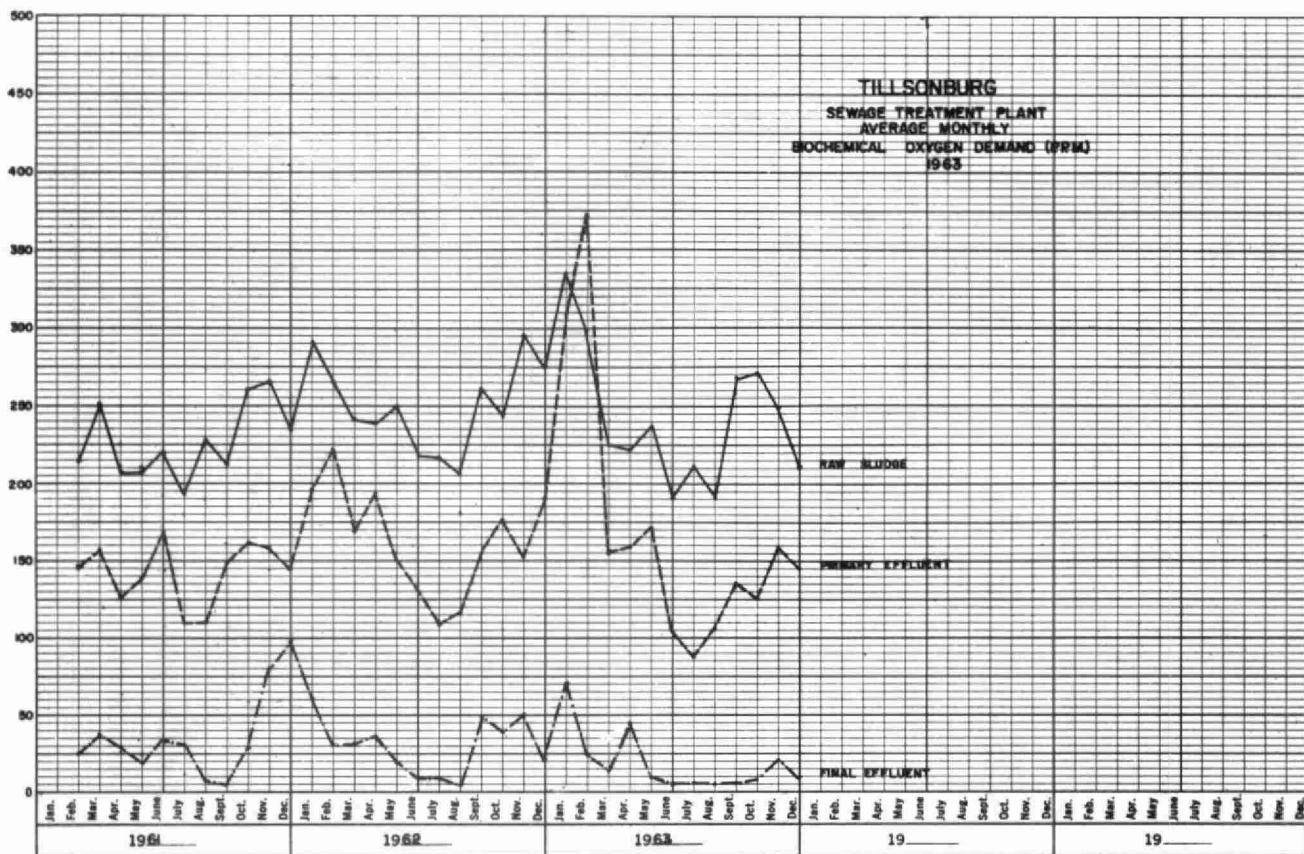
COMMENTS

The total flow for the year was 173.024 million gallons and the average daily flow for the year was .474 million gallons per day. The maximum 24 hour flow in the past year was .669 million gallons and occurred in the month of May as did the greatest average daily flow for one month of .540 million gallons.









GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	335	70.0	79.0	18.2	354	20	94.5	22.9	21
FEB.	298	24.0	92.0	17.7	330	17	95.0	20.3	18
MAR.	225	14.0	93.5	16.4	218	9	96.0	16.3	24
APR.	222	45.0	79.5	12.2	223	33	85.0	13.1	20
MAY	238	19.0	92.0	18.3	241	28	88.5	17.8	31
JUNE	190	5.0	97.5	14.1	554	16	97.0	40.9	22
JULY	212	5.5	97.0	15.2	268	4	98.5	19.4	60
AUG.	192	4.6	97.5	13.6	242	11	95.4	16.8	28
SEPT.	268	6.2	97.5	16.9	437	10	97.5	27.6	41
OCT.	270	8.3	97.0	18.7	307	10	96.5	20.9	48
NOV.	248	21.0	91.5	15.7	200	22	89.0	12.3	27
DEC.	210	9.6	95.0	14.8	229	12	94.5	16.1	15
TOTAL				191.8				244.4	355
AVG.	242.3	19.4	92.0	16.0	300.3	16.0	94.7	20.4	30

COMMENTS

An average loading of 242.3 ppm of BOD and 300.3 ppm S.S. was experienced in the raw sewage in 1963. The average BOD in the effluent of 19.4 ppm was slightly higher than the Ontario Water Resources Commission standard of 15 ppm and also the S.S. in the effluent was slightly higher than the Ontario Water Resources Commission standard of 15 ppm. The efficiencies of removal of 92.0% and 94.7% for BOD and S.S. respectively are quite satisfactory. The grit removed per million gallons of sewage treated was 2.05 cu.ft.

<u>MONTH</u>	<u>RAW SLUDGE TO DIGESTER</u>		<u>DIGESTED SLUDGE</u>	
	Volume (Gal.)	% Solids	Volume	% Solids
Jan.	208,500	-	-	-
Feb.	128,100	3.67	44,998	5.12
Mar.	153,750	-	34,167	-
Apr.	143,250	2.18	58,085	2.49
May	144,000	4.54	30,049	3.59
June	177,750	2.26	29,896	3.35
July	68,250	-	77,447	-
Aug.	153,750	-	46,695	1.87
Sept.	196,500	-	28,026	3.43
Oct.	221,250	-	83,995	4.09
Nov.	187,500	-	32,798	2.03
Dec.	<u>207,000</u>	-	<u>34,556</u>	-
TOTAL	1,989,600		500,712	

A total of 1,989,600 gallons of raw sludge was pumped to the digester during the year and a total of 500,712 gallons of digested sludge was hauled by tank truck. Supernatant was returned from the digester to the aeration section.

AERATION SECTION

MONTH	PRIM. EFFL. B.O.D. PPM.	ML.SS. PPM.	LBS. BOD. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. BOD. REMOVED
JANUARY	309	1412	34	1525
FEBRUARY	372	1574	40	959
MARCH	155	1470	19	2070
APRIL	159	1164	24	2439
MAY	172	876	39	1780
JUNE	104	895	19	3206
JULY	88	1158	13	4242
AUGUST	106	1049	17	3605
SEPTEMBER	135	1125	18	4147
OCTOBER	125	1028	19	5238
NOVEMBER	158	953	27	3396
DECEMBER	145	1158	21	3582
TOTAL				
AVERAGE	169	1155	24	3010

COMMENTS

As can be seen from the above data the loading on the aeration section over the year has been fairly heavy. The pounds of BOD per 100 pounds MLSS has held slightly below the recommended range of 30 to 40, however, is quite acceptable for this plant. Although the air used per pound of BOD removed is higher than acceptable quantities, this is due to the fixed nature of the blower output and the fact that the plant is operating below capacity.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	13,713	-	-
FEBRUARY	12,941	-	-
MARCH	15,590	-	-
APRIL	13,788	-	-
MAY	16,734	350*	4.19
JUNE	15,200	710	4.67
JULY	14,682	578	3.94
AUGUST	14,535	554	3.81
SEPTEMBER	12,910	332**	5.15
OCTOBER	14,305	-	-
NOVEMBER	13,808	-	-
DECEMBER	14,818	-	-
TOTAL	173,024	2414	-
AVERAGE	14,419	603	4.35

* Chlorine Dosing started May 15

** Chlorine Dosing ended September 19

COMMENTS

Chlorine at this plant is used for disinfection from May to September. An average dosage of 4.35 ppm of chlorine was necessary to give a 15 minute residual of approximately .5 ppm.

1963

PLANT

Total Operating Costs

MONTHLY

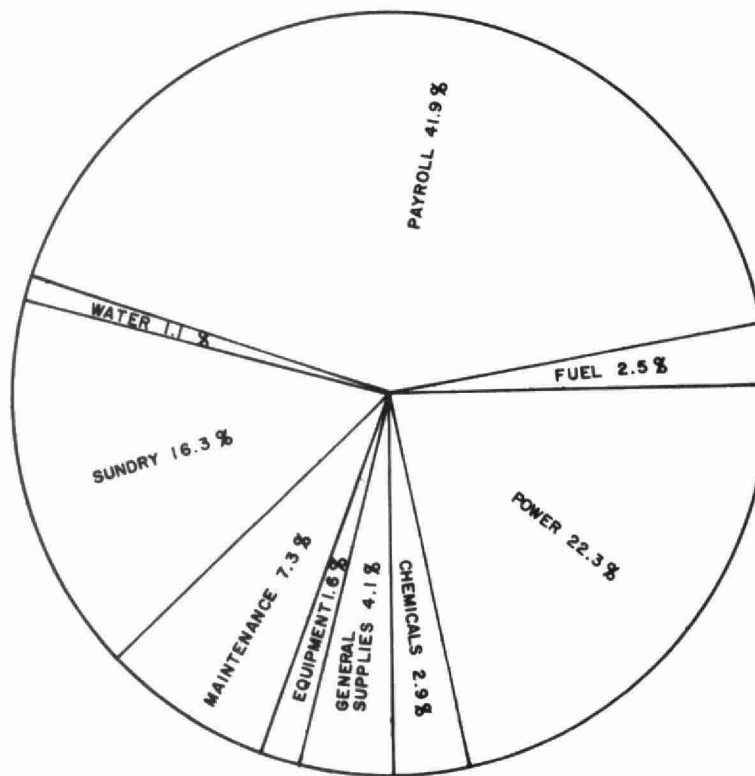
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY	WATER
JAN	1133.43	672.02	-	-	318.99	-	29.34	-	-	99.71	13.37
FEB	1274.28	632.96	-	108.03	315.22	-	27.12	82.11	57.22	39.11	12.51
MARCH	1711.53	632.96	-	121.23	308.20	-	65.46	-	79.22	483.12	11.34
APRIL	1154.91	632.96	-	117.74	326.87	-	38.63	1.25	-	27.20	10.26
MAY	1635.41	632.96	-	8.74	326.30	-	106.98	-	41.12	497.74	22.28
JUNE	2458.27	632.96	-	-	368.39	574.03	71.73	38.40	419.36	327.26	26.14
JULY	2202.76	949.44	-	118.90	362.58	(140.00)	26.50	186.85	145.99	520.42	32.08
AUG	1527.02	632.96	-	-	330.29	427.50	47.25	-	61.63	18.57	8.82
SEPT	1720.12	632.96	-	-	506.31	-	104.15	-	20.79	439.86	16.05
OCT	1272.51	632.96	-	-	388.35	(280.00)	58.71	-	253.58	209.37	9.54
NOV	1680.10	632.96	-	-	493.24	-	45.08	-	197.85	299.63	11.34
DEC	1982.70	949.44	-	-	399.33	-	178.57	-	167.78	252.82	34.76
TOTAL	19753.04	8267.54	-	484.64	4444.07	581.53	799.52	308.61	1444.54	3214.10	208.49

PLANT

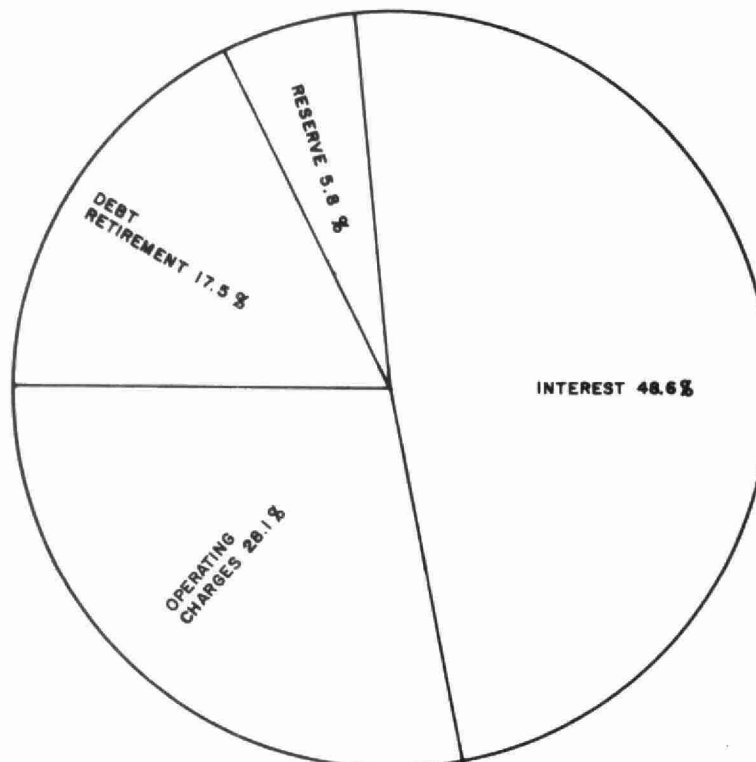
YEARLY

YEAR	M.G. TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER CAPITA PER YEAR
1961				
1962				
1963	173,024	\$19,753.04	\$114.20	\$2.99
CALCULATIONS IN THIS TABLE BASED ON A POPULATION OF 6,600.				

1963 OPERATING COSTS



TOTAL ANNUAL COSTS



SUMMARY

This report has given in detail significant data on the operation of the Tillsonburg Sewage Treatment Plant.

With an average daily flow of .474 million gallons per day, the plant is still below its design capacity of .660 million gallons per day.

The effluent being discharged into Otter Creek is satisfactory although it is slightly above the Ontario Water Resources Commission objectives for bio-chemical oxygen demand and suspended solids. Efforts will be continued in 1964 to improve the quality of the effluent.



Total 1963 Costs

The total cost to the municipality during 1963 was as follows:

Operating	\$19,753.04
Debt Retirement	\$12,304.00
Reserve	\$ 4,203.00
Interest	<u>\$34,188.84</u>
TOTAL	<u>\$70,448.88</u>

Note: The amount in the Reserve Account as of December 31, 1963 was \$11,958.50.

On the basis of the population being 6,600 the total annual cost of the Tillsonburg Sewage Treatment Plant was approximately \$10.67 per person.

Under constant supervision by head office engineers, the plant staff has operated and maintained a clean attractive and efficient plant for the Town of Tillsonburg. Special attention is given to good public relations and every year many casual visitors and organizations tour the facilities.



Division of Plant Operations

ONTARIO WATER RESOURCES COMMISSION
801 BAY ST. TORONTO 5